

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1-4. (Canceled)

5. (Currently Amended) The transducer of claim 8 [[4]] wherein the housing is structured to be sufficiently liquid tight so that no substantial amount of damping liquid can escape from the housing.

6. (Canceled)

7. (Currently Amended) The A transducer of claim 6 comprising:
a housing;
an electrical signal carrier physically connected to the housing, with the electric signal carrier being structured to carry an electrical signal;
carrier connection hardware structured to physically connect the electrical signal carrier member to the housing;
a magnetic member physically connected to the housing;
member connection hardware structured to physically connect the magnetic member to the housing, with the carrier connection hardware and the member connection hardware being structured and located to allow the electrical signal carrier and the magnetic member to vibrate relative to each other; and

damping liquid disposed within the housing to substantially surround at least one of the electrical signal carrier and the magnetic member;

wherein at least a portion of the electric signal carrier is shaped as a coil, with the coil defining a coil interior and a coil axis,

wherein[[::]] the carrier connection hardware is structured to substantially fix the location of the coil-shaped portion of the electric signal carrier member with respect to the housing[[;]], and

wherein the member connection hardware is structured to maintain the magnetic member at least partially within the coil interior such that the magnetic member is free to vibrate substantially in the direction of the coil axis.

8. (Currently Amended) The A transducer of claim 4 comprising:

a housing;

an electrical signal carrier physically connected to the housing, with the electric signal carrier being structured to carry an electrical signal;

carrier connection hardware structured to physically connect the electrical signal carrier member to the housing;

a magnetic member physically connected to the housing;

member connection hardware structured to physically connect the magnetic member to the housing, with the carrier connection hardware and the member connection hardware being structured and located to allow the electrical signal carrier and the magnetic member to vibrate relative to each other; and

damping liquid disposed within the housing to substantially surround at least one of the electrical signal carrier and the magnetic member,

wherein the magnetic member comprises a permanent magnet.

9. (Currently Amended) The A transducer of claim 4 comprising:
a housing;
an electrical signal carrier physically connected to the housing, with the electric signal carrier being structured to carry an electrical signal;
carrier connection hardware structured to physically connect the electrical signal carrier member to the housing;
a magnetic member physically connected to the housing;
member connection hardware structured to physically connect the magnetic member to the housing, with the carrier connection hardware and the member connection hardware being structured and located to allow the electrical signal carrier and the magnetic member to vibrate relative to each other; and
damping liquid disposed within the housing to substantially surround at least one of the electrical signal carrier and the magnetic member,

wherein the magnetic member comprises a magnetic core with a relative magnetic permeability greater than 1.0.

10. (Currently Amended) The A transducer of claim 4 comprising:
a housing;
an electrical signal carrier physically connected to the housing, with the electric signal carrier being structured to carry an electrical signal;

carrier connection hardware structured to physically connect the electrical signal carrier member to the housing;

a magnetic member physically connected to the housing;

member connection hardware structured to physically connect the magnetic member to the housing, with the carrier connection hardware and the member connection hardware being structured and located to allow the electrical signal carrier and the magnetic member to vibrate relative to each other; and

damping liquid disposed within the housing to substantially surround at least one of the electrical signal carrier and the magnetic member,

wherein the member connection hardware comprises a spring assembly structured and located to allow the magnetic member to vibrate in a linear direction relative to the housing along a linear vibration axis and also to allow the magnetic member to vibrate in a rotational direction relative to the housing about a rotational vibration axis.

11. (Original) The transducer of claim 10 wherein the spring assembly is structured and located so that the linear vibration axis is at least substantially the same as the rotational vibration axis.

12. (Original) The transducer of claim 10 wherein the spring assembly comprises a spring-like diaphragm.

13. (Currently Amended) The transducer of claim 8 [[4]] wherein the damping liquid is shock absorber liquid.

14. (Currently Amended) The transducer of claim 8 [[4]] wherein the damping liquid has a viscosity at 20 degrees Celsius between 0.5 and 1.0 centipoise.

15. (Currently Amended) The transducer of claim 8 [[4]] wherein the damping liquid has a viscosity at 20 degrees Celsius between 1.0 and 100 centipoise.

16. (Currently Amended) The transducer of claim 8 [[4]] wherein the electric signal carrier member, the magnetic member, the connection hardware and the damping liquid are structured and located so that external vibrations in at least the frequency range of 20 to 20,000 Hertz will induce the electric signal carrier member and the magnetic member to vibrate relative to each other.

17. (Currently Amended) The transducer of claim 8 [[4]] further comprising a musical instrument, wherein the electric signal carrier, the magnetic member, the carrier connection hardware, the member connection hardware and the damping liquid are structured and located so that acoustic vibrations of the musical instrument are sufficiently energetic to cause the magnetic member and the electric signal carrier to vibrate relative to each other.

18. (Currently Amended) The transducer hardware of claim 8 [[4]] further comprising an amplifier for electrically amplifying the electric signal of the electric signal carrier.

19. (Original) The transducer of claim 18 further comprising a speaker for transducing the amplified electric signal into acoustic vibration.

20. (Currently Amended) The transducer of claim 8 [[4]] further comprising an electric signal supply structured and located to supply an electric signal to the electric signal

carrier, with the magnitude and time distribution of the supplied electric signal being sufficient to drive the electric signal carrier and the magnetic member to vibrate relative to each other.

21. (Previously Presented) A method of designing a musical instrument assembly, the method comprising the steps of:

providing a musical instrument structured to output acoustic vibrations;

providing a plurality of transducers, with each transducer respectively comprising mutually vibrating components and damping liquid surrounding at least some of the vibrating components and with the plurality of transducers having different damping liquids;

using each transducer of the plurality of transducers to transduce the acoustic vibration of the musical instrument into a plurality of respective electrical signals;

reviewing the plurality of electric signals; and

selecting an optimal transducer based on the review of the plurality of electric signals.

22. (Original) The method of claim 21 further comprising the step of mounting the optimal transducer to the musical instrument.

23. (Original) The method of claim 21 wherein the damping liquids have differing viscosities.

24. (Original) The method of claim 21 wherein the review of the electric signals comprises the steps of:

transducing the plurality of electrical signals back into output acoustic vibration; and

listening to the output acoustic vibration.

25. (Canceled)

26. (Canceled)

27. (Currently Amended) The transducer of claim 31 [[26]] wherein the carrier connection hardware and the member connection hardware are structured and located so that:
the only substantial rotational vibration between the electric signal carrier and the magnetic member is the rotational vibration about the rotational axis; and
the only substantial linear vibration between the electric signal carrier and the magnetic member is the linear vibration along the linear axis.

28. (Original) The transducer of claim 27 wherein the rotational axis is substantially the same as the linear axis.

29. (Canceled)

30. (Canceled)

31. (Currently Amended) The A transducer of claim 30 comprising:
a housing;
an electrical signal carrier physically connected to the housing, with the electric signal carrier being structured to carry an electrical signal;
carrier connection hardware structured to physically connect the electrical signal carrier member to the housing;
a magnetic member physically connected to the housing;

member connection hardware structured to physically connect the magnetic member to the housing, with the carrier connection hardware and the member connection hardware being structured and located to allow the electrical signal carrier and the magnetic member to rotationally vibrate relative to each other at least about a rotational axis; and

damping liquid disposed within the housing to substantially surround at least one of the electric signal carrier and the magnetic member,

wherein the carrier connection hardware and the member connection hardware are structured and located to allow the electrical signal carrier and the magnetic member to rotationally and linearly vibrate relative to each other at least along a linear axis,

wherein at least a portion of the electric signal carrier is shaped as a coil, with the coil defining a coil interior and a coil axis, and

wherein the carrier connection hardware and the member connection hardware are structured and located so that the rotation axis is substantially the same as the coil axis.

32. (Original) The transducer of claim 31 wherein the carrier connection hardware and the member connection hardware are structured and located to allow relative linear vibration of the electric signal carrier and the magnetic member along the coil axis.

33. (Currently Amended) The A transducer of claim 25 comprising:
a housing;
an electrical signal carrier physically connected to the housing, with the electric signal carrier being structured to carry an electrical signal;
carrier connection hardware structured to physically connect the electrical signal carrier member to the housing;

a magnetic member physically connected to the housing;
member connection hardware structured to physically connect the magnetic member to
the housing, with the carrier connection hardware and the member connection hardware being
structured and located to allow the electrical signal carrier and the magnetic member to
rotationally vibrate relative to each other at least about a rotational axis; and
damping liquid disposed within the housing to substantially surround at least one of the
electric signal carrier and the magnetic member,
wherein the carrier connection hardware and the member connection hardware are
structured and located to allow the electrical signal carrier and the magnetic member to
rotationally and linearly vibrate relative to each other at least along a linear axis, and
wherein the spring assembly comprises a spring-like diaphragm with at least one aperture defined therein, with the spring-like diaphragm and aperture being shaped to cause rotational motion within the spring-like diaphragm when the spring-like diaphragm vibrates.

34. (Original) The transducer of claim 33 wherein the spring-like diaphragm is made from a material having an elasticity that is equal to or greater than that of Mylar.

35. (Original) The transducer of claim 33 wherein the diaphragm is made from a material having a relative magnetic permeability of less than 3.

36. (Original) The transducer of claim 33, wherein the diaphragm exhibits microphone characteristics.

37. (Original) The transducer of claim 33, wherein the diaphragm is made from Mylar.

38. (Original) The transducer of claim 33 wherein:

the spring-like diaphragm is substantially disk shaped; and

the spring aperture defines a plurality of curved, elongated apertures.

39. (Currently Amended) The transducer of claim 31 [[25]] further comprising an amplifier for electrically amplifying the electric signal of the electric signal carrier.

40. (Original) The transducer of claim 39 further comprising a speaker for transducing the amplified electric signal into acoustic vibration.

41. (Currently Amended) The transducer of claim 31 [[25]] further comprising an electric signal supply structured and located to supply an electric signal to the electric signal carrier, with the magnitude and time distribution of the supplied electric signal being sufficient to drive the electric signal carrier and the magnetic member to vibrate relative to each other.

42-49. (Canceled)